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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/982,383

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Rajendra Kumar

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7590

02/22/2006

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EXAMINER

KIM, KEVIN

ART UNIT

PAPER NUMBER

2638

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/982,383

Applicant(s)

KUMAR ET AL.

Examiner

Kevin Y. Kim

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2638

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-6 is/are allowed.
- 6) ☒ Claim(s) 1 and 7 is/are rejected.
- 7) ☒ Claim(s) 8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed November 30, 2005 have been fully considered but they are not persuasive.

First of all, the indication of allowability of claim 7 is withdrawn upon a review of the Marko et al patent, which actually describes sampling complex baseband signals, as explained below. This examiner previously had read, incorrectly, the Marko et al patent only discloses sampling a second IF signal.

Applicant argues that the Kost et al patent fails to teach any channelizing. However, since the claims define channelizing as the use of a plurality of A/D conversion circuits clocked by a polyphase clock generator, thus creating a plurality of digital channels, i.e., signal paths, from a complex baseband signal. With this definition in mind, one can see that the Kost et al exactly teaches such channelizing, as set forth in the ground of rejection. In addition, see the Kost et al at col.9, lines 49-53 describing an embodiment that can have more than two ADCs. The digital adders and multipliers, coupled to each of the A/D converters read on a plurality of polyphase filters in so far as those elements changes the characteristics of the digital signals output from the A/D converters.

Applicant asserts that, in the present invention, "wideband refers to a bandwidth of several hundreds megahertz rather than 12.5 Mhz used in Marko et al." And yet this fact does not change the fact that a plurality of lower rate ADCs provide better performance to the single ADC even if the signal frequency is 12.5 Mhz since, thus providing one skilled in the art for a

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sufficient motivation for combining the two cited references. Moreover, the specification fails to exclude the signals of bandwidth on the order of 12.5 Mhz.

Further, applicant argues that the channelizer of Marko et al is different from that of the claimed invention. However, this argument and explanation are irrelevant since that part of Marko et al is not relied on for the rejection of claims.

It is concluded that the substitution of polyphase clock generator and an accompanying plurality of samplers and converters, i.e., a plurality of ADCs, for a single ADC was shown to have been obvious in the receiver of Marko et al for reducing power consumption and non-linearity associated with the single A/D conversion of the wide bandwidth signal. In this proposed combination, a plurality of channels are provided, thus meeting the essential limitation of "channelizing an IF wideband signal into channelized digital output signals."

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marko et al (US 6,823,169 previously cited) in view of Kost et al (US 6,081,215 previously cited).

Claim 1.

Marko et al discloses a system, see Fig,5, comprising;

a complex mixer (216,218) for quadrature demodulation of a wideband IF input signal into a complex signal, the complex signal comprising I and Q quadrature baseband signals (see col. 6, lines 30-46),

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a sampler and converter, i.e., A/D converter (224,226), for converting the complex signal into sampled digital complex signals and

a clock generator (not shown but is required to provide a sampling clock signal to the A/D converter).

The claimed invention differs from Marko et al's receiver in that it uses a bank of samplers and a bank of converters, and a polyphase clock generator to provide sampling clocks to the plurality of samplers in a phase-staggered manner. Referring to Fig.4, Kost et al teaches a bank of low-rate A/D converters (48,50) and a polyphase clock generator (70) providing sampling clocks (71,73) of staggered phases to the A/D converters for the purpose of overcoming the shortcomings of a single A/D converter such as large power consumption and non-linearity when a wide bandwidth signal is to be sampled. See Cost et al at col. 1, lines 41-43. Kost et al further teach a polyphase filter bank of filters (78,80,82 and 84) for respectively filtering the sampled I and Q quadrature baseband signals. See col. 7, line 49 ~ col. 8, line 4. Note that the complex signal demodulated by the complex mixer in Marko et al's system has a wide bandwidth. See Mark et al at col. 5, lines 46-47. Thus, it would have been obvious to one skilled in the art at the time the invention was made to replace the A/D converters of Marko et al with a respective set of a plurality of low rate A/D converters (i.e., a bank of sampler coupled to a bank of converters) clocked by a polyphase clock generator, as taught by Kost et al, for the purpose of reducing power consumption and non-linearity associated with the single A/D conversion of the wide bandwidth signal in the receiver of Marko et al.

Allowable Subject Matter

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4. Claims 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. Claims 2-6 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin Kim

**KEVIN KIM
PATENT EXAMINER**